Each observer is to be armed with a 6-inch glass, all the glasses made by the same maker (for instance, Alvan Clark & Sons' Corporation), and to report according to the proposed standard scale of "seeing."

It is thus important that the said scale should be agreed to by astronomers generally before the various expeditions start.

Ephemeris for Physical Observations of the Moon for 1903.
By A. C. D. Crommelin.

| Greenwich Midnight. | Selenographical Oolong. of the Sun. | Lat. | Geocentric Libration | | | | C. |
			Sel. Long. of the Earth.	Lat.	Combined Amount.	Direction.	
1903. Jan. 1	308°·03	+1°·48	−4°·01	−6°·04	7°·25	146°·4	342°·88
2	320·20	+1·49	−5·11	−5·37	7·42	136·4	339·52
3	332·38	+1·50	−6·08	−4·46	7·54	126·3	337·04
4	344·55	+1·50	−6·88	−3·32	7·63	115·8	335·54
5	356·72	+1·51	−7·44	−1·99	7·70	105·0	335·11
6	8·88	+1·52	−7·68	−0·53	7·70	93·9	335·89
7	21·03	+1·52	−7·53	+1·00	7·60	82·4	337·94
8	33·18	+1·53	−6·93	+2·52	7·37	70·0	341·35
9	45·31	+1·53	−5·86	+3·93	7·05	56·2	346·24
10	57·44	+1·53	−4·31	+5·12	6·69	40·1	351·90
11	69·57	+1·53	−2·38	+5·99	6·45	21·7	358·48
12	81·69	+1·54	−0·22	+6·44	6·44	2·0	5·24
13	93·81	+1·53	+1·98	+6·43	6·73	342·9	11·56
14	105·93	+1·53	+4·01	+5·97	7·19	326·1	16·92
15	118·06	+1·53	+5·70	+5·10	7·65	311·8	20·98
16	130·19	+1·52	+6·91	+3·93	7·95	299·6	23·61
17	142·32	+1·52	+7·60	+2·56	8·02	288·6	24·81
18	154·47	+1·51	+7·78	+1·09	7·86	278·0	24·64
19	166·62	+1·50	+7·49	−0·39	7·50	267·0	23·27
20	178·78	+1·50	+6·83	−1·81	7·06	255·2	20·80
21	190·94	+1·49	+5·89	−3·11	6·66	242·2	17·40
22	203·11	+1·48	+4·74	−4·25	6·37	228·1	13·23
23	215·29	+1·47	+3·47	−5·20	6·25	213·7	8·47
24	227·47	+1·46	+2·14	−5·91	6·29	199·9	3·35
25	239·65	+1·46	+0·83	−6·37	6·42	187·4	358·08
26	251·84	+1·45	−0·45	−6·55	6·56	176·1	352·93
27	264·03	+1·44	−1·65	−6·45	6·66	165·7	348·09

Greenwich Midnight.	Selenographical Colong. | Lat. of the Sun.		Geocentric Libration				C.
			Sel. Long. | Lat. of the Earth.		Combined Amount.	Direction.	
1903. Jan. 28	276·23	+1·43	−2·78	−6·07	6·68	155·4	343·81
29	288·42	+1·43	−3·82	−5·41	6·61	144·8	340·23
30	300·61	+1·42	−4·75	−4·49	6·54	133·4	337·51
31	312·79	+1·41	−5·55	−3·35	6·48	121·1	335·77
Feb. 1	324·98	+1·41	−6·20	−2·04	6·53	108·2	335·09
2	337·16	+1·40	−6·65	−0·60	6·68	95·2	335·59
3	349·33	+1·39	−6·86	+0·90	6·92	82·5	337·29
4	1·50	+1·38	−6·75	+2·40	7·16	70·4	340·24
5	13·66	+1·37	−6·28	+3·78	7·33	59·0	344·45
6	25·81	+1·36	−5·43	+4·97	7·37	47·5	349·74
7	37·96	+1·35	−4·17	+5·89	7·22	35·3	355·86
8	50·10	+1·33	−2·59	+6·44	6·94	21·9	2·40
9	62·23	+1·32	−0·75	+6·56	6·60	6·5	8·82
10	74·36	+1·30	+1·17	+6·23	6·34	349·4	14·60
11	86·49	+1·29	+3·01	+5·47	6·24	331·2	19·29
12	98·63	+1·27	+4·60	+4·35	6·33	313·4	22·62
13	110·76	+1·25	+5·81	+2·97	6·53	297·1	24·48
14	122·89	+1·23	+6·57	+1·45	6·73	282·4	24·87
15	135·04	+1·21	+6·86	−0·11	6·86	269·1	23·92
16	147·19	+1·19	+6·70	−1·61	6·89	256·5	21·75
17	159·35	+1·17	+6·15	−3·00	6·84	244·0	18·57
18	171·51	+1·15	+5·29	−4·21	6·76	231·5	14·53
19	183·68	+1·12	+4·20	−5·20	6·68	218·9	9·87
20	195·85	+1·10	+2·97	−5·96	6·66	206·5	4·81
21	208·03	+1·08	+1·67	−6·46	6·67	194·5	359·55
22	220·22	+1·06	+0·37	−6·68	6·69	183·2	354·35
23	232·41	+1·04	−0·87	−6·61	6·67	172·5	349·40
24	244·61	+1·02	−2·01	−6·26	6·58	162·2	344·93
25	256·81	+1·01	−3·02	−5·62	6·38	151·7	341·12
26	269·01	+0·99	−3·88	−4·71	6·10	140·5	338·13
27	281·22	+0·97	−4·58	−3·57	5·81	127·9	336·09
28	293·42	+0·95	−5·11	−2·23	5·58	113·6	335·14
Mar. 1	305·62	+0·93	−5·46	−0·76	5·51	97·9	335·37
2	317·82	+0·91	−5·60	+0·67	5·64	83·2	336·81
3	330·02	+0·90	−5·55	+2·29	6·00	67·6	339·50
4	342·20	+0·88	−5·25	+3·70	6·43	54·8	343·40
5	354·39	+0·86	−4·71	+4·93	6·82	43·7	348·37
6	6·56	+0·83	−3·90	+5·88	7·06	33·6	354·18

Greenwich Midnight.	Selenographical Colong.	Lat. of the Sun.	Geocentric Libration				
			Sel. Long.	Lat. of the Earth.	Combined Amount.	Direction.	C.
1903. Mar. 7	18·73	+0·81	−2·85	+6·50	7·10	23·7	0·45
8	30·89	+0·79	−1·59	+6·71	6·89	13·3	6·73
9	43·05	+0·76	−0·19	+6·50	6·50	1·7	12·60
10	55·20	+0·74	+1·26	+5·86	5·99	347·9	17·60
11	67·35	+0·71	+2·65	+4·85	5·52	331·4	21·44
12	79·50	+0·68	+3·86	+3·54	5·24	312·5	23·88
13	91·64	+0·65	+4·80	+2·02	5·21	292·8	24·89
14	103·79	+0·62	+5·40	+0·42	5·42	274·4	24·48
15	115·94	+0·59	+5·63	−1·17	5·75	258·3	22·77
16	128·10	+0·56	+5·48	−2·65	6·09	244·2	19·90
17	140·26	+0·53	+5·00	−3·97	6·38	231·6	16·07
18	152·43	+0·51	+4·22	−5·06	6·59	219·8	11·53
19	164·60	+0·48	+3·21	−5·90	6·71	208·5	6·50
20	176·78	+0·45	+2·04	−6·48	6·80	197·5	1·23
21	188·97	+0·42	+0·78	−6·78	6·82	186·6	355·96
22	201·16	+0·39	−0·49	−6·78	6·80	175·9	350·92
23	213·36	+0·37	−1·69	−6·49	6·71	165·4	346·29
24	225·57	+0·34	−2·79	−5·92	6·54	154·8	342·26
25	237·78	+0·32	−3·71	−5·07	6·28	143·8	338·99
26	249·99	+0·29	−4·39	−4·02	5·96	132·5	336·62
27	262·21	+0·27	−4·91	−2·65	5·58	118·4	335·31
28	274·43	+0·25	−5·14	−1·17	5·27	102·8	335·16
29	286·65	+0·22	−5·11	+0·40	5·13	85·5	336·28
30	298·87	+0·20	−4·85	+1·98	5·24	67·8	338·68
31	311·08	+0·18	−4·36	+3·46	5·56	51·6	342·36
Apr. 1	323·30	+0·15	−3·67	+4·76	6·01	37·6	347·17
2	335·50	+0·13	−2·82	+5·79	6·44	26·0	352·86
3	347·70	+0·10	−1·85	+6·48	6·74	16·0	359·04
4	359·90	+0·07	−0·79	+6·77	6·82	6·7	5·31
5	12·08	+0·05	+0·30	+6·65	6·66	357·4	11·20
6	24·27	+0·02	+1·37	+6·12	6·27	347·4	16·33
7	36·44	−0·01	+2·38	+5·22	5·74	335·5	20·41
8	48·61	−0·04	+3·26	+4·01	5·17	320·9	23·23
9	60·78	−0·07	+3·97	+2·56	4·72	302·8	24·71
10	72·94	−0·11	+4·47	+1·00	4·58	282·6	24·81
11	85·11	−0·14	+4·72	−0·60	4·76	262·8	23·57
12	97·27	−0·17	+4·71	−2·14	5·17	245·6	21·12
13	109·44	−0·20	+4·42	−3·53	5·66	231·4	17·61

| Greenwich Midnight. | Selenographical Colong. | Lat. of the Sun. | Geocentric Libration | | | | C. |
			Sel. Long. of the Earth.	Lat.	Combined Amount.	Direc-tion.	
1903.	°	°	°	°	°	°	°
Apr. 14	121·61	−0·23	+3·88	−4·72	6·11	219·4	13·26
15	133·79	−0·26	+3·09	−5·67	6·46	208·6	8·32
16	145·97	−0·29	+2·11	−6·34	6 68	198·4	3·05
17	158·16	−0·32	+0·97	−6·73	6·80	188·2	357·72
18	170·35	−0·34	−0·27	−6·82	6·83	177·7	352·54
19	182·55	−0·37	−1·53	−6·62	6·80	167·0	347·76
20	194·76	−0·39	−2·74	−6·13	6·72	155·9	343·53
21	206 97	−0·42	−3·83	−5·37	6·60	144·5	340·01
22	219·18	−0·44	−4·73	−4·36	6·44	132·7	337·34
23	231·41	−0·47	−5·38	−3·12	6·22	120·1	335·65
24	243·64	−0·49	−5·74	−1·69	5·98	106·4	335·06
25	255·87	−0·51	−5·73	−0·14	5·73	91·4	335·72
26	268·11	−0·53	−5·39	+1·46	5·59	74·8	337·69
27	280·34	−0·56	−4·72	+3·00	5·59	57·6	341·01
28	292·58	−0·58	−3·75	+4·39	5·77	40·5	345·59
29	304·81	−0·60	−2·58	+5·52	6·10	25·1	351·20
30	317·05	−0·62	−1·28	+6·31	6·44	11·5	357·46
May 1	329·27	−0·64	+0·05	+6·69	6·69	359·6	3 87
2	341·49	−0·67	+1·31	+6·65	6·78	348·9	9·95
3	353·70	−0·69	+2·43	+6·20	6·66	338·6	15·30
4	5·90	−0·72	+3·36	+5·38	6·34	328·0	19·60
5	18·10	−0·75	+4·09	+4·24	5·90	316·0	22·69
6	30·29	−0·77	+4·58	+2·88	5·41	302·2	24·48
7	42·48	−0·80	+4·85	+1·38	5·04	285·9	24·92
8	54·66	−0·82	+4·92	−0·18	4·92	267·9	24·08
9	66·85	−0·85	+4·77	−1·70	5·06	250·4	22·02
10	79·03	−0·87	+4·43	−3·11	5·42	234·9	18·86
11	91·21	−0·90	+3·90	−4·34	5·83	221·9	14·78
12	103·39	−0·92	+3·18	−5·35	6·22	210·7	10·00
13	115·57	−0·95	+2·30	−6·09	6·51	200·7	4·80
14	127·76	−0·97	+1·25	−6·55	6·67	190·8	359·42
15	139·95	−0·99	+0·09	−6·72	6·72	180·8	354·16
16	152·15	−1·01	−1·15	−6·59	6·69	170·1	349·22
17	164·35	−1·03	−2·43	−6·18	6·64	158·5	344·81
18	176·56	−1·05	−3·67	−5·51	6·62	146·3	341·07
19	188·78	−1·07	−4·80	−4·58	6·64	133·7	338·14
20	201·00	−1·09	−5·75	−3·44	6·70	120·9	336·12
21	213·23	−1·10	−6·42	−2·11	6·76	108·2	335·14

Greenwich Midnight.	Selenographical Colong. | Lat. of the Sun.		Geocentric Libration				O.
			Sel. Long. | Lat. of the Earth.		Combined Amount.	Direction.	
1903.	°	°	°	°	°		°
May 22	225·46	−1·12	−6·73	−0·64	6·76	95·4	335·31
23	237·71	−1·13	−6·65	+0·91	6·71	82·2	336·74
24	249·94	−1·15	−6·13	+2·46	6·61	68·1	339·52
25	262·19	−1·16	−5·17	+3·89	6·47	53·0	343·66
26	274·44	−1·18	−3·83	+5·11	6·39	36·9	348·99
27	286·69	−1·19	−2·22	+6·01	6·41	20·3	355·20
28	298·93	−1·20	−0·47	+6·51	6·53	4·1	1·81
29	311·18	−1·22	+1·27	+6·57	6·69	349·1	8·25
30	323·41	−1·24	+2·85	+6·19	6·81	335·3	14·00
31	335·64	−1·25	+4·16	+5·42	6·83	322·5	18·70
June 1	347·87	−1·27	+5·14	+4·33	6·72	310·1	22·12
2	0·08	−1·29	+5·77	+3·01	6·51	297·6	24·21
3	12·30	−1·30	+6·06	+1·54	6·25	284·3	24·94
4	24·50	−1·32	+6·06	+0·02	6·06	270·2	24·38
5	36·70	−1·34	+5·81	−1·47	5·99	255·8	22·62
6	48·90	−1·35	+5·35	−2·86	6·07	241·9	19·76
7	61·09	−1·37	+4·71	−4·09	6·24	229·0	15·95
8	73·29	−1·38	+3·92	−5·11	6·44	217·5	11·38
9	85·48	−1·40	+3·01	−5·88	6·61	207·1	6·30
10	97·67	−1·41	+2·04	−6·37	6·69	197·8	0·96
11	109·86	−1·42	+0·84	−6·58	6·63	187·3	355·63
12	122·06	−1·43	−0·38	−6·50	6·51	176·7	350·58
13	134·26	−1·44	−1·67	−6·14	6·36	164·8	346·00
14	146·46	−1·45	−2·97	−5·52	6·27	151·7	342·06
15	158·67	−1·45	−4·24	−4·65	6·30	137·6	338·91
16	170·88	−1·46	−5·41	−3·58	6·49	123·5	336·61
17	183·10	−1·46	−6·40	−2·32	6·81	109·9	335·32
18	195·32	−1·47	−7·12	−0·93	7·18	97·4	335·10
19	207·56	−1·47	−7·49	+0·55	7·51	85·8	336·05
20	219·79	−1·48	−7·44	+2·04	7·71	74·7	338·26
21	232·04	−1·48	−6·89	+3·46	7·71	63·3	341·79
22	244·28	−1·48	−5·85	+4·72	7·52	51·1	346·60
23	256·53	−1·49	−4·35	+5·71	7·18	37·3	352·49
24	268·79	−1·49	−2·49	+6·33	6·80	21·5	359·06
25	281·04	−1·49	−0·43	+6·51	6·53	3·8	5·77
26	293·30	−1·50	+1·63	+6·23	6·44	345·3	12·01
27	305·55	−1·50	+3·52	+5·52	6·54	327·5	17·28
28	317·79	−1·51	+5·07	+4·45	6·75	311·3	21·25

48 *Mr. Crommelin, Ephemeris for Physical*   LXIII. I,

Greenwich Midnight.	Selenographical Colong.	Lat. of the Sun.	Geocentric Libration		Combined Amount.	Direction.	C.
			Sel. Long. of the Earth.	Lat.			
1903. June 29	330·03	−1·51	+6·21	+3·12	6·95	296·7	23·78
30	342·26	−1·52	+6·92	+1·64	7·11	283·3	24·89
July 1	354·49	−1·52	+7·19	+0·11	7·19	270·9	24·62
2	6·70	−1·53	+7·10	−1·38	7·23	259·0	23·11
3	18·92	−1·53	+6·70	−2·77	7·25	247·5	20·48
4	31·13	−1·53	+6·05	−4·00	7·26	236·5	16·88
5	43·33	−1·53	+5·21	−5·02	7·23	226·1	12·50
6	55·53	−1·53	+4·24	−5·80	7·17	216·2	7·56
7	67·73	−1·53	+3·15	−6·31	7·05	206·5	2·29
8	79·92	−1·53	+1·99	−6·53	6·83	197·0	356·96
9	92·11	−1·53	+0·76	−6·47	6·51	186·7	351·82
10	104·31	···1·53	−0·51	−6·13	6·15	175·2	347·09
11	116·50	−1·52	−1·81	−5·53	5·82	161·9	342·97
12	128·70	−1·52	−3·10	−4·68	5·61	146·5	339·60
13	140·91	−1·51	−4·35	−3·63	5·66	129·8	337·11
14	153·11	−1·50	−5·50	−2·40	6·00	113·6	335·56
15	165·32	−1·49	−6·49	−1·05	6·57	99·2	335·04
16	177·54	−1·48	−7·24	+0·38	7·25	87·0	335·64
17	189·76	−1·48	−7·66	+1·83	7·88	76·6	337·41
18	201·98	−1·47	−7·67	+3·22	8·32	67·2	340·40
19	214·22	−1·46	−7·20	+4·48	8·48	58·1	344·62
20	226·46	−1·45	−6·24	+5·51	8·32	48·6	349·97
21	238·70	−1·44	−4·79	+6·22	7·85	37·6	356·19
22	250·95	−1·43	−2·94	+6·53	7·16	24·2	2·86
23	263·21	−1·42	−0·94	+6·38	6·45	8·4	9·43
24	275·46	−1·41	+1·32	+5·77	5·92	347·1	15·19
25	287·71	−1·41	+3·36	+4·76	5·82	324·8	19·83
26	299·96	−1·40	+5·09	+3·43	6·14	304·0	23·02
27	312·20	−1·39	+6·40	+1·91	6·68	286·6	24·67
28	324·44	−1·38	+7·24	+0·32	7·25	272·5	24·84
29	336·67	−1·38	+7·62	−1·25	7·72	260·7	23·65
30	348·90	−1·37	+7·58	−2·70	8·05	250·4	21·25
31	1·12	−1·36	+7·17	−3·97	8·20	241·0	17·82
Aug. 1	13·33	−1·35	+6·47	−5·03	8·20	232·1	13·59
2	25·54	−1·34	+5·57	−5·83	8·06	223·7	8·75
3	37·74	−1·33	+4·48	−6·36	7·78	215·2	3·55
4	49·94	−1·31	+3·28	−6·61	7·38	206·4	358·22
5	62·14	−1·30	+2·06	−6·57	6·89	197·4	353·03

| Greenwich Midnight. | Selenographical Colong. | Lat. of the Sun. | Geocentric Libration | | | | |
			Sel. Long. of the Earth.	Lat. of the Earth.	Combined Amount.	Direction.	C.
1903. Aug. 6	74·33	− 1·28	+ 0·78	− 6·24	6·29	187·1	348·18
7	86·52	− 1·26	− 0·50	− 5·65	5·67	174·9	343·89
8	98·70	− 1·25	− 1·77	− 4·81	5·13	159·8	340·33
9	110·89	− 1·23	− 2·99	− 3·75	4·80	141·4	337·60
10	123·09	− 1·21	− 4·15	− 2·52	4·86	121·3	335·82
11	135·28	− 1·19	− 5·19	− 1·16	5·32	102·6	335·06
12	147·48	− 1·17	− 6·07	+ 0·27	6·08	87·5	335·39
13	159·68	− 1·15	− 6·73	+ 1·72	6·95	75·7	336·85
14	171·88	− 1·13	− 7·10	+ 3·11	7·76	66·3	339·48
15	184·09	− 1·11	− 7·11	+ 4·37	8·35	58·4	343·25
16	196·31	− 1·09	− 6·73	+ 5·43	8·65	51·1	348·12
17	208·53	− 1·07	− 5·91	+ 6·20	8·56	43·6	353·90
18	220·76	− 1·05	− 4·66	+ 6·61	8·09	35·2	0·25
19	233·00	− 1·03	− 3·03	+ 6·59	7·25	24·7	6·72
20	245·24	− 1·01	− 1·15	+ 6·13	6·24	10·6	12·80
21	257·49	− 0·99	+ 0·84	+ 5·23	5·30	350·9	17·96
22	269·73	− 0·97	+ 2·77	+ 3·97	4·84	325·1	21·82
23	281·98	− 0·95	+ 4·48	+ 2·44	5·10	298·6	24·17
24	294·22	− 0·94	+ 5·84	+ 0·79	5·89	277·7	24·96
25	306·46	− 0·92	+ 6·77	− 0·87	6·82	262·7	24·25
26	318·69	− 0·90	+ 7·27	− 2·43	7·66	251·5	22·19
27	330·92	− 0·88	+ 7·33	− 3·81	8·26	242·5	19·00
28	343·13	− 0·86	+ 7·01	− 4·96	8·59	234·7	14·89
29	355·34	− 0·84	+ 6·36	− 5·84	8·63	227·5	10·12
30	7·55	− 0·82	+ 5·45	− 6·43	8·43	220·3	4·95
31	19·75	− 0·80	+ 4·36	− 6·72	8·01	213·0	359·61
Sept. 1	31·95	− 0·77	+ 3·14	− 6·73	7·43	205·0	354·35
2	44·14	− 0·75	+ 1·87	− 6·44	6·71	196·2	349·39
3	56·33	− 0·73	+ 0·58	− 5·88	5·91	185·6	344·94
4	68·51	− 0·70	− 0·68	− 5·06	5·11	172·3	341·16
5	80·69	− 0·67	− 1·88	− 4·02	4·44	154·9	338·20
6	92·87	− 0·64	− 2·97	− 2·78	4·07	133·1	336·16
7	105·04	− 0·61	− 3·94	− 1·41	4·18	109·7	335·15
8	117·22	− 0·59	− 4·76	+ 0·05	4·76	89·4	335·22
9	129·40	− 0·56	− 5·40	+ 1·53	5·61	74·2	336·42
10	141·58	− 0·53	− 5·82	+ 2·95	6·53	63·1	338·79
11	153·77	− 0·50	− 5·99	+ 4·25	7·35	54·6	342·30
12	165·96	− 0·47	− 5·87	+ 5·35	7·95	47·6	346·87

E

Greenwich Midnight.	Selenographical Colong. of the Sun.	Lat.	Geocentric Libration		Combined Amount.	Direction.	C.
			Sel. Long. of the Earth.	Lat.			
1903 Sept. 13	178·16	−0·45	−5·44	+6·18	8·24	41·4	352·32
14	190·36	−0·42	−4·70	+6·66	8·15	35·2	358·37
15	202·57	−0·39	−3·66	+6·75	7·68	28·5	4·66
16	214·78	−0·37	−2·34	+6·42	6·83	20·0	10·73
17	227·00	−0·34	−0·84	+5·67	5·73	8·4	16·10
18	239·23	−0·32	+0·77	+4·53	4·59	350·4	20·42
19	251·46	−0·29	+2·35	+3·10	3·89	322·8	23·36
20	263·69	−0·27	+3·89	+1·46	4·16	290·6	24·81
21	275·92	−0·25	+4·98	−0·24	4·99	267·2	24·73
22	288·15	−0·23	+5·86	−1·90	6·16	252·0	23·19
23	300·38	−0·20	+6·36	−3·40	7·21	241·9	20·37
24	312·60	−0·18	+6·49	−4·67	7·99	234·3	16·49
25	324·81	−0·15	+6·24	−5·67	8·44	227·7	11·82
26	337·02	−0·13	+5·66	−6·36	8·52	221·7	6·65
27	349·22	−0·10	+4·81	−6·75	8·29	215·5	1·26
28	1·42	−0·07	+3·74	−6·83	7·79	208·7	355·90
29	13·61	−0·05	+2·53	−6·61	7·08	200·9	350·81
30	25·79	−0·02	+1·24	−6·11	6·23	191·5	346·19
Oct. 1	37·97	+0·01	−0·04	−5·35	5·35	179·6	342·20
2	50·15	+0·04	−1·27	−4·36	4·54	163·8	338·99
3	62·31	+0·07	−2·39	−3·16	3·96	142·9	336·66
4	74·48	+0·10	−3·34	−1·80	3·79	118·3	335·33
5	86·64	+0·13	−4·09	−0·34	4·10	94·8	335·08
6	98·80	+0·17	−4·62	+1·17	4·77	75·8	335·98
7	110·96	+0·20	−4·90	+2·64	5·57	61·7	338·08
8	123·12	+0·23	−4·93	+4·00	6·35	50·9	341·37
9	135·29	+0·26	−4·73	+5·16	7·00	42·5	345·75
10	147·45	+0·29	−4·29	+6·05	7·41	35·3	351·06
11	159·62	+0·32	−3·65	+6·60	7·54	28·9	357·00
12	171·80	+0·34	−2·82	+6·77	7·33	22·6	3·20
13	183·98	+0·37	−1·86	+6·54	6·80	15·9	9·24
14	196·18	+0·40	−0·79	+5·91	5·96	7·6	14·70
15	208·37	+0·42	+0·35	+4·90	4·91	355·9	19·23
16	220·58	+0·44	+1·50	+3·59	3·89	337·3	22·54
17	232·78	+0·47	+2·60	+2·05	3·31	308·2	24·47
18	245·00	+0·49	+3·60	+0·39	3·62	276·2	24·94
19	257·21	+0·51	+4·43	−1·27	4·61	254·0	23·98
20	269·43	+0·53	+5·04	−2·83	5·78	240·7	21·65

Greenwich Midnight.	Selenographical Colong. | Lat. of the Sun.		Geocentric Libration				C.
	Colong.	Lat.	Sel. Long. of the Earth.	Lat.	Combined Amount.	Direction.	
1903	°	°	°	°		°	°
Oct. 21	281·64	+0·56	+5·39	−4·20	6·83	232·1	18·14
22	293·85	+0·58	+5·44	−5·30	7·60	225·7	13·70
23	306·05	+0·60	+5·18	−6·11	8·01	220·3	8·61
24	318·26	+0·63	+4·62	−6·61	8·06	214·9	3·18
25	330·45	+0·65	+3·79	−6·78	7·77	209·2	357·70
26	342·64	+0·68	+2·74	−6·65	7·19	202·4	352·45
27	354·83	+0·70	+1·52	−6·23	6·41	193·7	347·63
28	7·01	+0·73	+0·23	−5·55	5·56	182·4	343·42
29	19·18	+0·75	−1·09	−4·63	4·75	166·8	339·95
30	31·35	+0·78	−2·31	−3·51	4·20	146·7	337·33
31	43·51	+0·81	−3·39	−2·21	4·05	123·1	335·66
Nov. 1	55·66	+0·83	−4·25	−0·79	4·32	100·5	335·03
2	67·81	+0·86	−4·82	+0·70	4·87	81·7	335·54
3	79·96	+0·89	−5·07	+2·18	5·52	66·7	337·26
4	92·10	+0·91	−4·99	+3·58	6·15	54·3	340·20
5	104·24	+0·94	−4·59	+4·81	6·65	43·7	344·34
6	116·38	+0·96	−3·89	+5·78	6·96	33·9	349·52
7	128·52	+0·99	−2·99	+6·42	7·08	25·0	355·47
8	140·67	+1·01	−1·94	+6·66	6·94	16·2	1·77
9	152·82	+1·03	−0·84	+6·50	6·55	7·4	7·96
10	164·99	+1·05	+0·26	+5·94	5·95	357·5	13·60
11	177·15	+1·07	+1·28	+5·01	5·17	345·7	18·32
12	189·32	+1·09	+2·21	+3·78	4·38	329·7	21·87
13	201·50	+1·11	+3·01	+2·34	3·81	307·9	24·11
14	213·68	+1·12	+3·68	+0·76	3·76	281·7	24·96
15	225·88	+1·14	+4·21	−0·84	4·29	258·7	24·43
16	238·07	+1·15	+4·60	−2·38	5·18	242·6	22·56
17	250·27	+1·17	+4·82	−3·76	6·12	232·0	19·49
18	262·47	+1·18	+4·86	−4·92	6·91	224·6	15·39
19	274·67	+1·20	+4·69	−5·80	7·46	219·0	10·51
20	286·87	+1·21	+4·28	−6·37	7·67	213·9	5·14
21	299·06	+1·23	+3·63	−6·62	7·55	208·7	359·62
22	311·25	+1·24	+2·75	−6·57	7·12	202·7	354·20
23	323·44	+1·26	+1·67	−6·22	6·44	195·0	349·17
24	335·62	+1·28	+0·43	−5·60	5·62	184·4	344·72
25	347·80	+1·29	−0·91	−4·75	4·84	169·2	341·00
26	359·97	+1·31	−2·26	−3·69	4·33	148·5	338·11
27	12·12	+1·32	−3·54	−2·47	4·32	124·9	336·12

Greenwich Midnight.	Selenographical Colong.	Lat. of the Sun.	Geocentric Libration				O.
			Sel. Long.	Lat. of the Earth.	Combined Amount.	Direction.	
1903.	°	°	°	°	°	°	°
Nov. 28	24·28	+ 1·34	− 4·65	− 1·12	4·78	103·5	335·13
29	36·43	+ 1·36	− 5·51	+ 0·30	5·52	86·9	335·21
30	48·58	+ 1·37	− 6·02	+ 1·75	6·27	73·8	336·44
Dec. 1	60·71	+ 1·39	− 6·04	+ 3·15	6·81	62·5	338·89
2	72·85	+ 1·40	− 5·80	+ 4·41	7·28	52·8	342·58
3	84·98	+ 1·42	− 5·05	+ 5·45	7·43	42·8	347·44
4	97·10	+ 1·43	− 3·92	+ 6·17	7·31	32·4	353·27
5	109·23	+ 1·44	− 2·53	+ 6·52	6·99	21·2	359·66
6	121·36	+ 1·45	− 1·00	+ 6·43	6·51	8·8	6·14
7	133·49	+ 1·46	+ 0·55	+ 5·92	5·95	354·7	12·16
8	145·63	+ 1·47	+ 1·96	+ 5·03	5·40	338·7	17·29
9	157·77	+ 1·47	+ 3·17	+ 3·83	4·97	320·4	21·20
10	169·92	+ 1·48	+ 4·12	+ 2·41	4·77	300·3.	23·75
11	182·08	+ 1·48	+ 4·80	+ 0·86	4·88	280·2	24·91
12	194·25	+ 1·48	+ 5·23	− 0·70	5·28	262·4	24·67
13	206·42	+ 1·49	+ 5·45	− 2·20	5·88	248·0	23·13
14	218·60	+ 1·49	+ 5·46	− 3·56	6·52	236·9	20·40
15	230·78	+ 1·49	+ 5·31	− 4·71	7·10	228·4	16·63
16	242·97	+ 1·49	+ 4·99	− 5·61	7·50	221·6	12·04
17	255·16	+ 1·50	+ 4·51	− 6·21	7·68	216·0	6·83
18	267·35	+ 1·50	+ 3·86	− 6·51	7·57	210·7	1·35
19	279·54	+ 1·50	+ 3·03	− 6·49	7·16	205·0	355·87
20	291·73	+ 1·50	+ 2·03	− 6·18	6·51	198·2	350·69
21	303·92	+ 1·51	+ 0·86	− 5·60	5·66	188·7	346·02
22	316·10	+ 1·51	− 0·44	− 4·78	4·80	174·7	342·05
23	328·28	+ 1·51	− 1·82	− 3·76	4·18	154·2	338·90
24	340·45	+ 1·52	− 3·22	− 2·58	4·13	128·7	336·64
25	352·61	+ 1·52	− 4·55	− 1·28	4·73	105·7	335·34
26	4·77	+ 1·52	− 5·72	+ 0·10	5·72	89·0	335·05
27	16·92	+ 1·52	− 6·64	+ 1·50	6·81	77·3	335·85
28	29·07	+ 1·52	− 7·21	+ 2·86	7·75	68·4	337·79
29	41·22	+ 1·52	− 7·35	+ 4·12	8·43	60·7	340·91
30	53·35	+ 1·52	− 6·99	+ 5·20	8·71	53·4	345·22
31	65·48	+ 1·52	− 6·12	+ 6·00	8·57	45·6	350·61

The longitudes are reckoned in the plane of the Moon's equator, the axis of reference being the radius which passes through the mean centre of the visible disc. This axis therefore rotates with the Moon, and is not fixed in space.

The inclination of the Moon's equator to the ecliptic is taken as $1°\cdot523$, the value used in the *Connaissance des Temps*, that given by the *Nautical Almanac* being $1°\cdot536$.

The physical librations in longitude and latitude, as given by Professor Franz's formulæ, have been applied; their values are taken from the *Berliner Jahrbuch* for the days given there, and interpolated by a graphical method for the other days. But the signs in the *Jahrbuch* require to be reversed in order to reduce to the system used here.

The colongitude of the Sun is 90° (or 450°) *minus* his selenographical longitude. It also is the selenographical longitude of the morning terminator reckoned eastward from the mean centre of the disc. Hence its value is approximately 270°, 0°, 90°, 180° at new Moon, first quarter, full Moon, last quarter respectively. The longitude of the evening terminator is of course 180° greater or less than that of the morning one.

When the geocentric libration in longitude is positive, the region brought into view is on the west limb; when negative, on the east.

When the geocentric libration in latitude is positive, the region brought into view is at the Moon's north pole; when negative, at the south.

The column "Combined Amount" gives the distance between the apparent and mean centres of the disc, and the column "Direction" gives the position-angle of the apparent centre from the mean centre, or, which is the same thing, the position-angle of the region which is most carried into view by libration. The angles are reckoned eastward from the northern extremity of the Moon's axis.

C denotes the geocentric position-angle of the northern extremity of the Moon's axis measured eastward from the northernmost point of the disc. It has been computed by the second formula given in the Preface to the *Nautical Almanac*, but the co-ordinates of the Moon's equator have been taken from the *Connaissance des Temps*, so as to make this column consistent with the rest of the ephemeris.

The terms "East" and "West" are used throughout with reference to our sky, and not as they would appear to an observer on the Moon.

I give the method for finding the altitude of the Sun at a given point on the Moon whose position is defined: (1) by selenographical longitude and latitude; (2) by direction cosines.

In either case the Sun's selenographical colongitude and latitude (K, L supposed) must be found by interpolation from the ephemeris for the given time.

In the first case let the given point be in the position longitude M, latitude N. Longitudes are reckoned from the meridian passing through the mean centre of the disc, and the positive direction is that towards Mare Crisium. North latitudes are considered positive.

Then

sine Sun's altitude $= \sin L \sin N + \cos L \cos N \sin (K+M)$.

In the second case let ξ, η, ζ be the direction cosines of the given point. The axes are (1) that diameter of the Moon's equator which is 90° from the mean centre of the disc; (2) the Moon's polar axis; (3) the diameter through the mean centre of the disc. The positive directions are as above. Mr. Saunder has issued some maps of portions of the Moon's surface from which the co-ordinates ξ, η, ζ can be taken at sight.

Then the Sun's direction cosines are:

$$\cos K \cos L, \; \sin L, \; \sin K \cos L,$$

and sine Sun's altitude

$$= \xi \cos K \cos L + \eta \sin L + \zeta \sin K \cos L.$$

Neither formula is convenient when the Sun's altitude is very great, for an angle near 90° cannot be accurately determined from its sine. However, when the Sun is high the shadows are so inconspicuous that it is not necessary to compute his altitude with great accuracy.

Benvenue, 55 Ulundi Road, Blackheath, S.E. :
      1902 September 1.

Erratum in Mr. Aldis's paper, vol. lxii. p. 636, line 5 :

for $a \times \cdot 20878$ read $a \times \cdot 41745$.